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WebSockets for NVEs

McGregor, Don

Monterey, California. Naval Postgraduate School

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Don McGregor
Research Associate
MOVES Institute

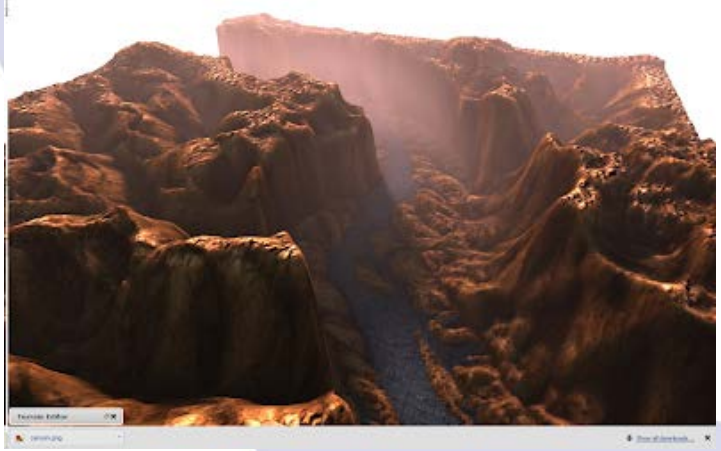
mcgredo@nps.edu

New Technology Convergence

- WebGL: accelerated 3D graphics in the web page
- Websockets: TCP sockets directly to the web browser page, without AJAX
- Javascript: general purpose programming language that runs in the web page
- HTML5

WebGL

- Accelerated 3D graphics for Javascript in the web browser, from Khronos group (OpenGL)



WebGL

- Supported by Chrome, Firefox, Safari, some mobile devices; standard created by Khronos, group that controls the OpenGL standard
- Not supported by Microsoft—they use the competing, equivalent Silverlight product
- Effectively this is OpenGL ES for Javascript. There are packages that layer on top of WebGL and provide scene graphs, model loading, and other functionality, such as X3DOM, Three.js, GLGE, Copperlict, etc

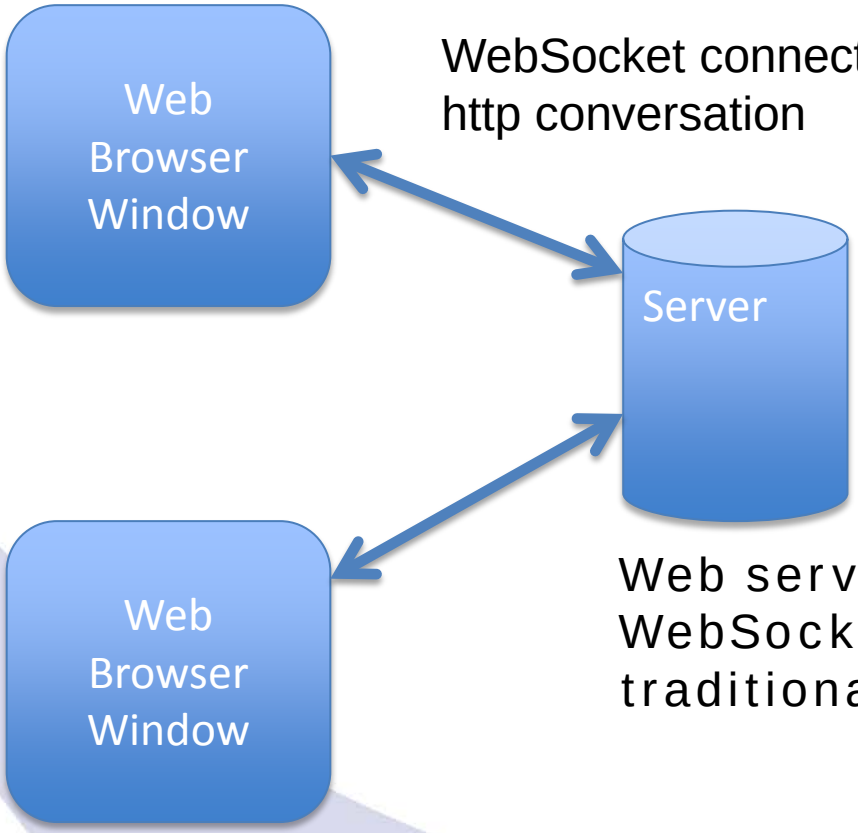
WebGL

- *No plugins*. Getting plugin approval in NMCI is difficult; WebGL is built into the web browser, and the Javascript WebGL frameworks are usually only several hundred KB and downloaded as part of the web page.

WebSockets

- WebSockets are a joint standard between IETF (the protocol) and W3C (the API).
- Allow TCP connections from a server to Javascript code inside a web browser window
- This is a major advance over AJAX techniques, which typically revolve around client polling of the server, and therefore have very high latency

WebSockets


Web Browser Window
WebSocket connection, negotiated with (near) http conversation
Server
Web Browser Window
Web server with additional WebSocket capability on traditional port 80/443

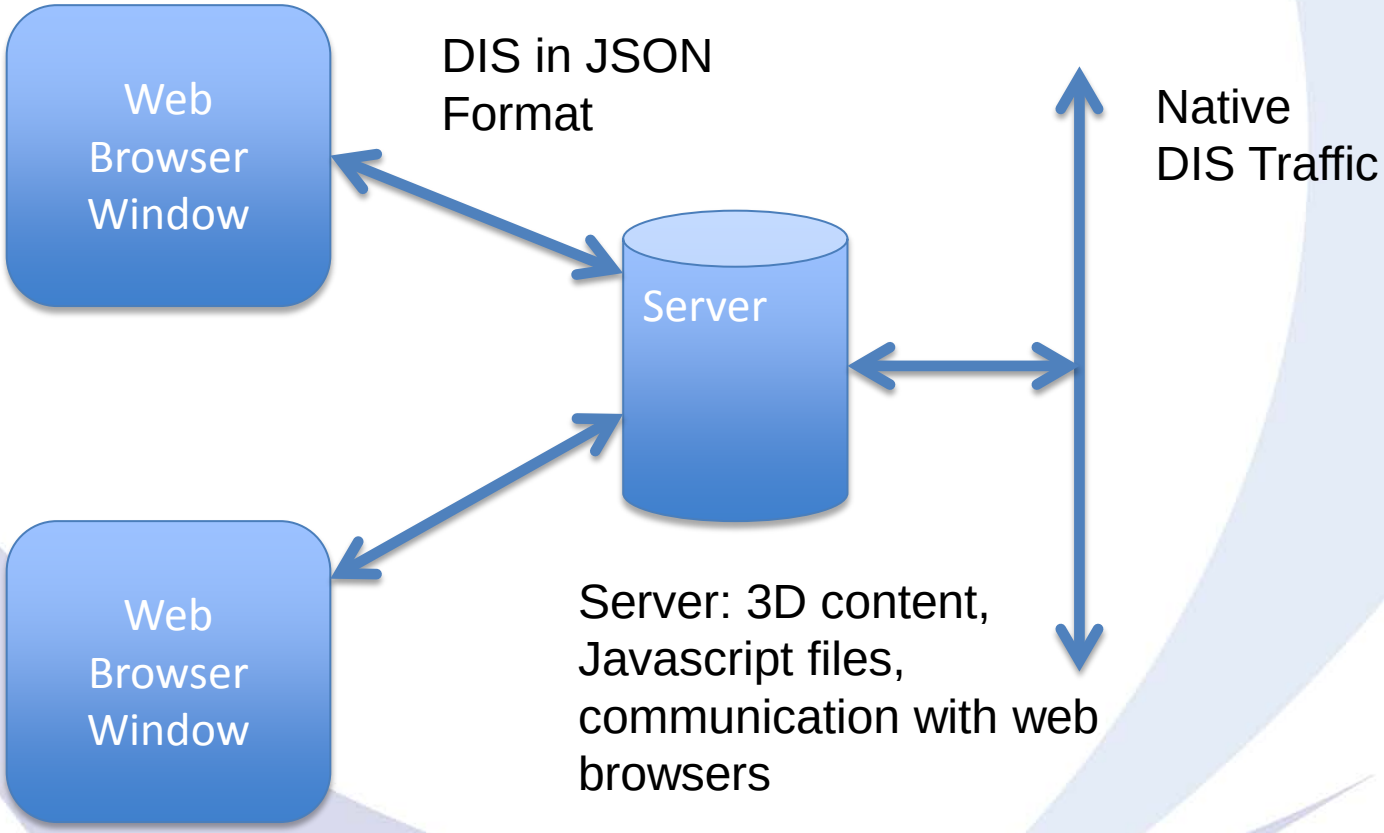
Javascript

- General purpose scripting language, present in almost all browsers
- Performance has dramatically increased in the last few years in response to demands from AJAX web applications; generally speaking it is now “fast enough”

HTML5

- New <canvas> and <video> tags allow much more flexiblity
- Embed WebGL scene in a <canvas> element

Architecture



Architecture

- Native DIS traffic on UDP on the server side—this can be any DIS application, such as VBS2, or an HLA application with a DIS gateway
- WebSocket connections from the server to each browser window pass Javascript JSON-format DIS
- Server acts as central hub and can relay DIS to the native network
- Not necessarily virtual; can have plan views, data collection & sim management web apps (these are lower risk initial applications)

Javascript

- Can use WebWorker standard for multiple threads in one page (with limitations)
- Javascript packages for physics are available
- Potential for server-side area of interest management/DDM
- Clustering on data center side for scalability?
- Cloud deployment?

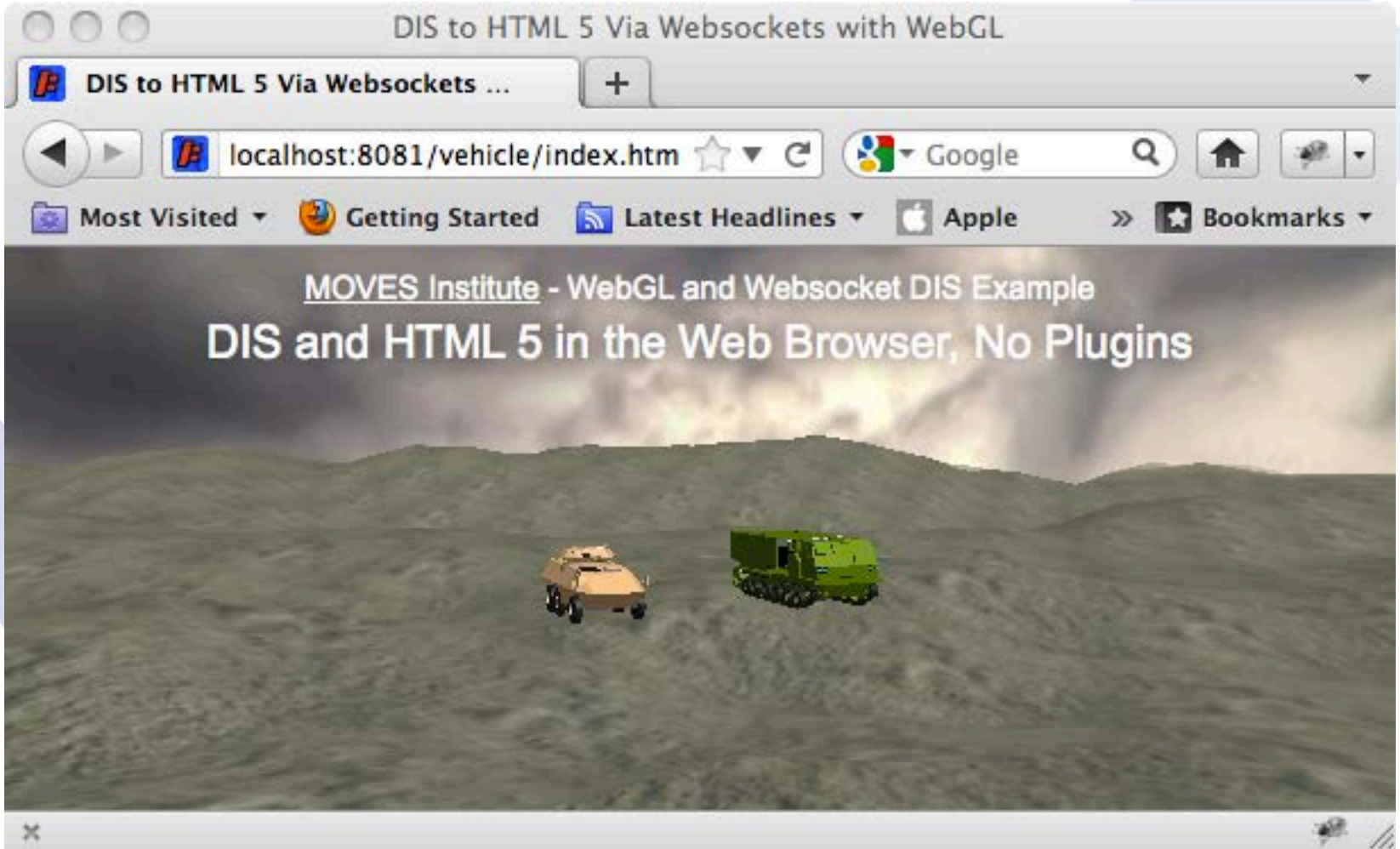
Performance

- Several hundred JSON format DIS PDUs per second to browser windows!
- Acceptable latency on LANs (with expected TCP vs. UDP pathologies on bad connections)
- Good enough for small-to-medium Networked Virtual Environments

SISO WebLVC

- “WebLVC is an interoperability protocol that enables web-based applications (typically JavaScript applications running in a web browser) to interoperate in Modeling and Simulation (M&S) federations.”
- Intended to work across multiple standards (DIS, HLA, TENA) though focused on RPR-FOM/DIS style information
- Focused on network protocol, not graphics
- Working group just starting; siw-sg-lvc@discussions.sisostds.org
- Potential to be disruptive technology

Demo


DIS to HTML 5 Via Websockets with WebGL
DIS to HTML 5 Via Websockets ...
localhost:8081/vehicle/index.htm
Google
Most Visited
Getting Started
Latest Headlines
Apple
Bookmarks
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DIS and HTML 5 in the Web Browser, No Plugins